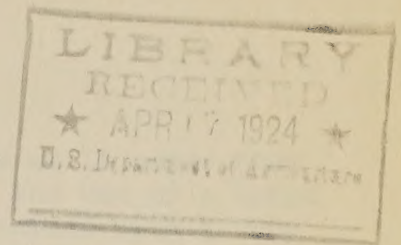


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UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY,
Washington, D.C.

CONTROL OF THE MEXICAN BEAN BEETLE IN THE EASTERN STATES.

The Mexican bean beetle (Epilachna corrupta Muls.) is the most serious insect enemy of garden beans in portions of the United States which it inhabits. Long present in the Southwest, it has within the past few years made its appearance in the southeastern States and now covers portions of nine States in the South and North, including Alabama, Georgia, Tennessee, Kentucky, North Carolina, South Carolina, Mississippi, Virginia, and Ohio.

The adult insect or beetle is copper colored, bears eight black spots on each wing cover, and measures about one-fourth of an inch in length. Newly emerged specimens are lemon colored. The female lays orange-yellow eggs in clusters of from 40 to 60 on the lower surface of the leaves, and these hatch in about 6 days during summer into small spiny orange-yellow larvae, which molt three times, gradually becoming larger until they are about one-third of an inch in length. The larva then transforms to the pupa or inactive stage on the under surface of the leaf, or on weeds or objects near by, and emerges as an adult or beetle in about 7 days, making a total from egg to adult of about 33 days during summer in Alabama. A maximum of four generations occurred in 1921-1922, two generations with a partial third being the rule.

When the beetles are abundant, the bean plants may be destroyed before a crop is produced. The adults and larvae feed on the under sides of the bean leaves, leaving a characteristic network of tissue which soon dries up. In control practice, therefore, insecticides must be directed to the under surfaces of the leaves. The Mexican bean beetle can be successfully suppressed with the use of the proper insecticide properly applied. Any of the ordinary stomach poisons will poison the larval stages of the bean beetle, and it is in the larval or grub stage that the insect feeds most. But not all stomach poisons may be applied to beans with beneficial results on account of the susceptibility of the bean plant to arsenical injury. Lead arsenate, zinc arsenite, and Paris green are too injurious to beans to be very useful. Good results may be apparent after an application, but yields may be seriously reduced if any of these compounds are applied repeatedly.

Control measures are essential to bean production in sections where the bean beetle thrives.

Magnesium arsenate, of very low water-soluble arsenic content, does not injure common beans, used either as a spray or as a dust. When this material is applied to the under surfaces of the leaves at a pressure of not less than 150 pounds with at least two nozzles to the row, excellent control can be obtained and practically normal yields secured. From one to four applications are necessary for a crop of bush beans, depending on the numbers of beetles present. Used as a dust, magnesium arsenate may be diluted with hydrated or plasterer's lime from one to five times by weight, depending on the numbers of beetles present.

Calcium arsenate seriously injures beans when used as it comes from the manufacturers. Injury to beans can be eliminated by the use of a large excess of hydrated lime. Excellent results have been obtained with a very high grade of this material used as a spray at the rate of three-quarters of a pound to 50 gallons with a pound and a half or more of hydrated lime. It may also be used as a dust, but more lime must be used. No less than five parts of hydrated lime should be used, and even at this dilution, under certain conditions, some plant injury may result. It has been developed by the Alabama Experiment Station that one part of sulphur, when mixed with one part of calcium arsenate and four parts of hydrated lime by weight, has a slight beneficial action in a dust, and this dust can be used under almost all conditions without plant injury.

Where ordinary calcium arsenate, which conforms with requirements of the law, as prepared for use on cotton against the boll weevil, is used, nine parts of hydrated lime will eliminate plant injury. This mixture will give excellent control under most conditions, except where beetles are extremely numerous.

When the beetle is numerous, it is essential to keep a coating of one of the above stomach poisons on the under surfaces of the leaves continually during the growing period. This can be most efficiently and most economically done by the use of a spray where conditions and equipment permit. Where spraying is not practicable, on account of water facilities, type of field, etc., or can not be practiced without unreasonable outlay of equipment, the grower is advised to dust. As in spraying, the dust must be directed to the under surfaces of the leaves.

The type of machine to be used depends upon the size of the field. On fields of usual size in trucking districts from half an acre to 2 acres in area, a wheelbarrow sprayer, capable of maintaining 150 pounds at two nozzles arranged on a "U"-shaped tube so as to direct the spray to the under surfaces of the leaves, will be found fairly satisfactory. This may be mounted on a narrow slide and drawn by a horse. A barrel sprayer may be placed on a wagon and a boom arranged to reach the under surfaces of the leaves. For dusting on this sized field, a hand power duster will be found very satisfactory. One of the most important requisites for success is the placing of the dust on the under surfaces of the leaves. This can be done very well by the use of a knapsack type of hand bellows duster, equipped with a flexible hose and long spout. Other dusters may also prove satisfactory if they are modified so as to direct the dust to the under surfaces of the leaves.

On larger acreages, a traction sprayer or a power sprayer, handling from four to eight rows with at least two nozzles per row, should be used. Where dusting is preferred, a traction duster which is equipped so that the dust can be directed to the under surfaces of the row from both sides will be found the most satisfactory from the standpoint of original outlay and upkeep.

In spraying, about 90 gallons of spray will be required for an acre of bush beans planted in rows 3 feet apart. In dusting, the amount of dust required per acre will depend somewhat on the amount of arsenical in the dust. The amount used should be gauged so that not less than 2 pounds of the arsenical used in the dust is applied to an acre of bush beans planted in rows 3 feet apart. In the calcium arsenate 1, hydrated lime 9, mixture, about 20 pounds are required for an acre. When more concentrated mixtures are used, less dust may be applied.

There is no danger of arsenical poisoning from eating snap beans which have been properly treated with arsenicals, but treated beans should be rinsed twice in clear water before marketing. In accordance with ordinary cleanliness, snap beans should be washed before they are cooked.

NEALE F. HOWARD,
Entomologist,
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February 23, 1924.

Approved: L. O. HOWARD

Chief of Bureau.

In summary, about 25 pounds of water will be required for an acre of beans planted in rows 1 foot apart. In addition, the amount of water required per acre will depend somewhat on the amount of water in the soil. The amount of water required for an acre of beans planted in rows 1 foot apart, in the case of a dry soil, is estimated to be about 25 pounds of water per acre. In the case of a moist soil, the amount of water required for an acre of beans planted in rows 1 foot apart, is estimated to be about 10 pounds of water per acre. When more concentrated solutions are used, less water may be applied.

There is no danger of essential poisoning from eating any beans which have been properly treated with cyanide, but heated beans should be heated in clean water before eating. In accordance with ordinary cleanliness, any beans should be washed before they are cooked.

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February 23, 1934.

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